Installation and Maintenance Manual

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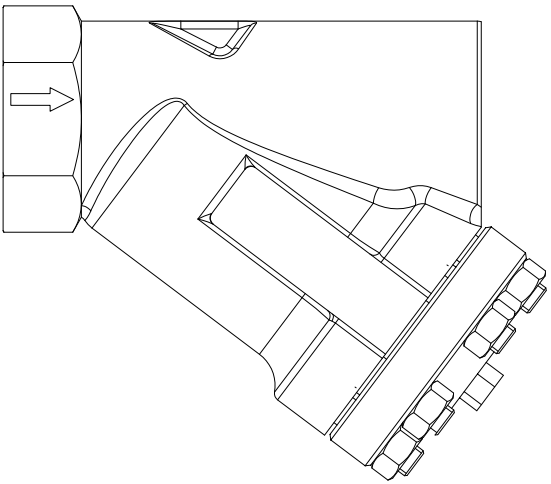
Forbes Marshall Forged Strainer

FMSTR51#600 / FMSTR52#600



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PLEASE NOTE - Throughout this manual this cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked. This symbol denotes CAUTION, WARNING or DANGER.

1. Preface:

This manual is intended for anyone using, commissioning, servicing, or disposing the below mentioned products safely and efficiently.

Forbes Marshall Forged Strainer [FMSTR51#600 / FMSTR52#600]

Size: DN 15(½"), DN 20 (¾"), DN 25 (1"), DN 40 (1 ½").

PLEASE NOTE:

Throughout this manual the following cautionary symbol is used to describe a potential damage or injury that might occur if the safety considerations are overlooked.

2. Important Safety Notes:

Read this section carefully before installing/operating/maintaining the product. The precautions listed in this manual are provided for personnel and equipment safety. Furthermore, Forbes Marshall accepts no responsibility for accidents or damage occurring as a result of failure to observe these precautions. Note that the product is designed to perform for non-contaminated fluids only. A contamination in the form of chemical, foreign particle etc. can lead to problem with product performance and life of the product.

If these products in compliance with the operating instructions are, properly installed, commissioned, maintained and installed by qualified personnel (refer Section 2.7) the safety operations of these products can be guaranteed. General instructions for proper use of tools and safety of equipments, pipeline and plant construction must also be complied with.

2.1 Intended use:

Check if the product is suitable for intended use/ application by referring to the installation and maintenance instructions, name plates and technical information sheets.

i) The product is suitable for use as defined in the technical information sheet. In case the need arises to use the product on any other fluid please contact Forbes Marshall for assistance.

ii) Check for the suitability in conformance to the limiting conditions specified in technical information sheet of the product.

iii) The correct installation and direction of fluid flow has to be determined.

iv) Forbes Marshall products are not intended to resist external stresses, hence necessary precautions to be taken to minimize the same.

2.2 Accessibility and Lighting:

Safe accessibility and working conditions are to be ensured prior to working on the product.

2.3 Hazardous environment and media:

The product has to be protected from hazardous environment and check to ensure that no hazardous liquids or gases pass through the product.

2.4 Depressurizing of systems and normalizing of temperature:

Ensure isolation and safety venting of any pressure to the atmospheric pressure. Even if the pressure gauge indicates zero, do not make an assumption that the system has been depressurized.To avoid danger of burns allow temperature to normalize after isolation.

2.5 Tools and consumables:

Ensure you have appropriate tools and / or consumables available before starting the work. Use of original Forbes Marshall replacement parts is recommended.

2.6 Protective clothing:

Consider for the requirement of any protective clothing for you/ or others in the vicinity for protection against hazards of temperature (high or low), chemicals, radiation, dangers to eyes and face, noise and falling objects.

2.7 Permits to work:

All work to be carried out under supervision of a competent person. Training should be imparted to operating personnel on correct usage of product as per Installation and Maintenance instruction. "Permit to work" to be complied with (wherever applicable), in case of absence of this system a responsible person should have complete information and knowledge on what work is going on and where required, arrange to have an assistant with his primary goal and responsibility being safety. "Warning Notices" should be posted wherever necessary.

2.8 Handling:

There is a risk of injury if heavy products are handled manually. Analyze the risk and use appropriate handling method by taking into consideration the task, individual, the working environment and the load.

2.9 Freezing:

Provision should be made to protect systems which are not self-draining, against frost damage (in environment where they may be exposed to temperatures below freezing point) to be made.

2.10 Returning products:

Customers and Stockist are reminded that, when returning products to Forbes Marshall they must provide information on any hazards and the precautions to be taken due to contamination residues or mechanical damage which may present a health, safety or environmental risk.

This information must be provided in writing including Health and Safety data sheets relating to any substances identified as hazardous or potentially hazardous.

3. Brief Product Information:

3.1 Description:

The Forbes Marshall Forged Strainer, FMSTR51#600 / FMSTR52#600 , are Y-type forged steel strainers with stainless steel screen having 0.8 mm perforations as standard.

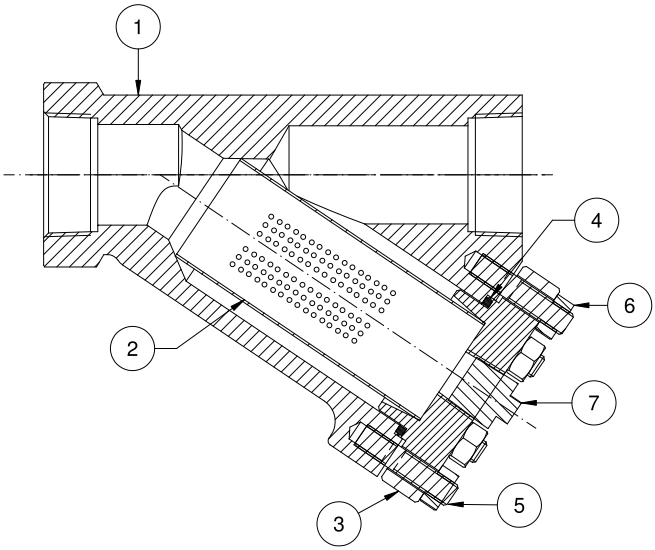


Figure 1 : Forbes Marshall Forged Strainer

Material

Sr. No.	Part	Material	Standard
1	Body M/C (BSPT, NPT & SWE)	Forged carbon steel	ASTM A105
2	Screen 0.8 mm perforation	Stainless steel	AISI 304
3	Cap M/C	Forged carbon steel	ASTM A105
4	Gasket	Stainless steel	Spiral wound SS304 with flexible graphite filler
5	Stud M10 X 45 long	Steel	ASTM A193 Gr. B7
6	Hex nut M10	Steel	ASTM A194 Gr. 2H
7	½" BSPT end plug	Forged carbon steel	ASTM A105

3.2 Sizes and Pipe Connection

DN 15, 20, 25 and 40

Screwed BSPT / NPT (FMSTR51#600) and Socket weld ends (FMSTR52#600)

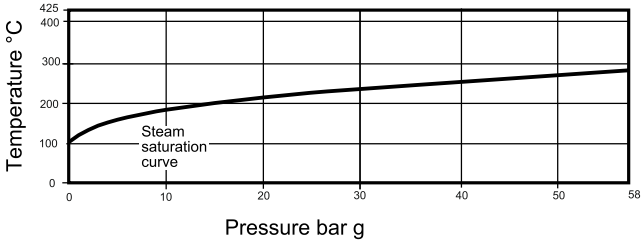
Note :

1. Available with IBR certificate.
2. Other screen perforations available on special order.
3. Also available with ASA -150 , 300 and 600 weld-on flange on request .
4. Blow down or drain cock connections : the cap is drilled to 1/2"BSPT to enable a blow down or drain cock to be fitted.

3.3 Limiting Conditions:

Parameter	Screwed ends	Socket weld ends
PMO (kg/cm^2)	31.5	58
TMO (°C)	425	425
Cold Hydraulic Test Pressure (Kg/cm^2)	63	116

3.4 Operating Range:



3.5 Product Dimension and Drawing:

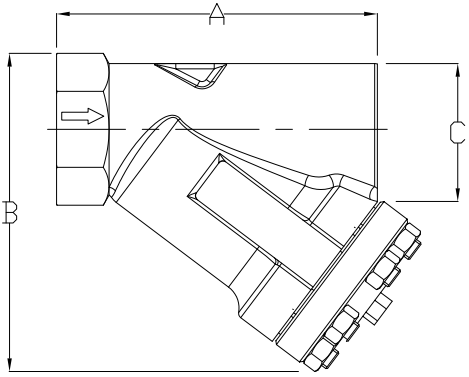


Figure 2 : Dimensional Drawing of FMSTR51#600 / FMSTR52#600

Dimensions (approx.) in mm

Size (DN)	A	B	C	Weight (kg)
15	122	92	50	3
20	122	92	50	3
25	122	92	50	5
40	195	137	65	7

4. Product Working Principle:

Forbes Marshall Forged Strainer is used to remove dirt, debris and other foreign particles from the fluid, it restrict the particle size which are larger than specified sieve size (mesh or perforation). Pressure drop across the strainer will increase as dirt and debris will block the opening of the sieve. As pressure drop increases above certain specified limit the strainer sieve need to be cleaned.

5. Installation Guidelines : [Refer Figure 3 and 4]

Note: Before implementing any installations observe the 'Important Safety notes" in section 2. Referring to the Installation and Maintenance Instructions, name-plate and Technical Information Sheet, check that the product is suitable for the intended installation.

1. Check the direction marked on the strainer and the direction of fluid flow.
2. Remove protective covers from connections.
3. Strainer can be fitted on steam /gases and liquid systems in either horizontal pipework or vertical pipework when the flow and strainer pocket pointing downward. In a horizontal pipeline on steam / gas system the strainer pocket should be in the horizontal plane as this reduces the possibility of water hammer because of condense steam get accumulated in screen when strainer pocket pointed downward. On liquid systems the strainer pocket should point downwards.
4. Suitable isolation valves must be installed to allow for safe maintenance.

   Note: Never install strainer in vertical pipework with flow from bottom to top it can lead to re-entrainment of filtered dirt or foreign particles back into the incoming flow.
5. Strainer can be lagged (insulated) if required.

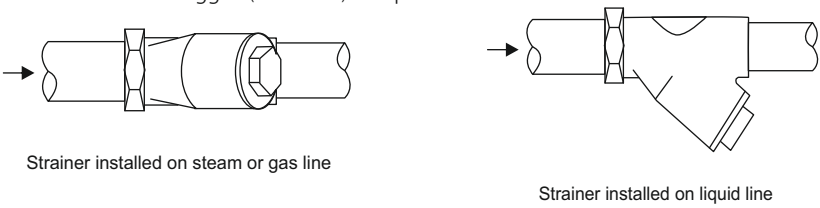


Figure 3 : Strainer installation on horizontal pipework

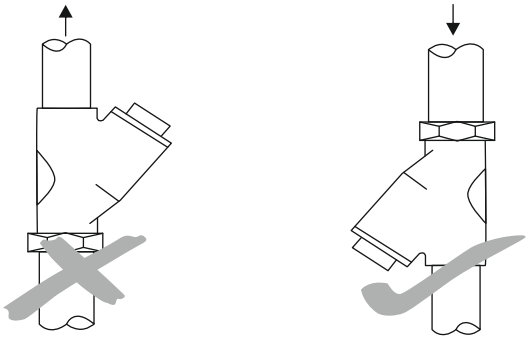


Figure 4 : Strainer installation on vertical pipework

6. Start-up and Commissioning:

6.1. Flushing of lines:

As part of pre-installation all fluid handling equipment particularly piping should be thoroughly cleaned of scale and the internal debris which accumulates during construction. This is accomplished by blowing or flushing with air, steam, water and other suitable medium.

Follow this step to carry out flushing of lines.

Note: For a detailed procedure on flushing of lines please visit Forbes Marshall website.

6.2. Commissioning:

After installation or maintenance ensure that the system is fully functioning by confirming fluid is passing through it.

7. Maintenance Guidelines:

Note: Before undertaking any maintenance of the product it must be isolated from both supply line and return line and ensure pressure is normalized to atmosphere. The product should then be allowed to cool. When re-assembling ensure that all joint faces are clean.

Note: The strainer cap gasket contains a thin stainless steel support ring which may cause physical injury if not handled and disposed of carefully.

7.1. Routine and preventive maintenance:

Please refer to the maintenance schedule mentioned in the table below to undertake routine maintenance of the Forbes Marshall Forged Strainer

Sr. No.	PARAMETERS TO BE CHECKED	FREQUENCY FOR CHECKING VARIOUS PARAMETERS					
		Daily	Weekly	Monthly	Quarterly	Half Yearly	Annually
1.	Clean of the screen					Y	

7.2. Recommended tightening torques:

Size	Part	Torque Range
DN 15 / 20/ 25	Stud (5)	15 – 20 Nm
	Nut (6)	
DN 40	Stud (5)	80 – 85 Nm
	Nut (6)	

Table 1: Recommended tightening torques for Forbes Marshall Forged Strainer

7.3. Procedure to clean or replace strainer screen: [Refer figure 1]

1. Unscrew Hex. nuts (6) and remove the strainer cap (3).
2. Remove the muck and clean screen (2) thoroughly, fit screen carefully and fit cap (3) with new gasket (4).
3. Apply a thin coating of jointing paste.
4. Tighten Hex. nuts (6) uniformly open up isolation valve. Check for gasket (4) leak if any then tighten the Hex. nuts (6) of strainer cap (3) if required.

8. Troubleshooting:

If the expected performance is unachievable after installation of the Strainer, check the following points for appropriate corrective measures.

Failure Mode	Possible Cause	Remedy
No flow through strainer.	Strainer screen is clogged with rust or debris.	Flush inline drip leg or pipeline and clean the screen. If screen is rusted, replace with new screen.
Increased pressure drop across the strainer.	Screen is blocking up.	Clean or replace the screen.
Fluid leakage from strainer pocket.	Gasket deterioration or damage.	Replace with new gasket and tighten the Hex.nut of the Strainer cap to the recommended torque.

Note: Never attempt to modify the product. When replacing old part with new part, use the spare parts listed in section 9.

9. Available Spares: [Refer figure 5]

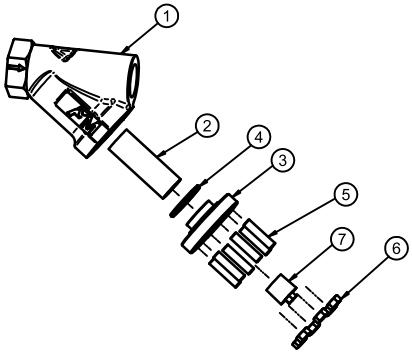


Figure 5 : Exploded view of Forbes Marshall Forged Strainer [FMSTR51#600/FMSTR52#600]

Spares	Part No.	Spare Code
Screen & Gasket kit for DN 15/20/25 FMSTR51#600/FMSTR52#600 [Pack of 5]	2,4	015-25FMSTR51-52600-SKit
Screen & Gasket kit for DN 40 FMSTR51#600/FMSTR52#600 [Pack of 3]	2,4	015-25FMSTR51-52600-GKit
Gasket kit for DN 15/20/25 FMSTR51#600/FMSTR52#600 [Pack of 5]	4	040FMSTR51-52600-SKit
Gasket kit for DN 40 FMSTR51#600/FMSTR52#600 [Pack of 5]	4	040FMSTR51-52600-GKit

How to Order:
Example : 1 No. DN 40 Forbes Marshall Forged Strainer, FMSTR51#600 / FMSTR52#600, screwed BSPT, IBR

How to Order Spares:
Always order spares by using the description given in the column headed "Available Spares" in user manual

10. Warranty Period:

As per ordering information and agreements in the contract.

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